UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,860	12/14/2001	David Adler	P989	1659

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EXAMINER
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ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,17-20 and 28* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 17-20, 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/01/02 &8/13/02*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

1.   Applicant's election without traverse of species II claims 1-2, 17-20, and 28 in the

reply filed on 4/21/05 is acknowledged.

2.   Claims 3-16, 21-27, 29-48 are withdrawn from further consideration pursuant to

37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable

generic or linking claim. Election was made **without** traverse in the reply filed on

4/21/05.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4.   Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention.

5.   Claim 28 recites the limitation "said particles" in line 2. There is insufficient

antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public
> use or on sale in this country, more than one year prior to the date of application for patent in the United
> States.

7.   Claims 1, 17, 18, are rejected under 35 U.S.C. 102(b) as being anticipated by

Wagner et al. (U.S. Patent 5,659,172).

As to claim 1, Wagner discloses a method of inspecting and/or characterizing a substrate, comprising:

obtaining a first dataset, wherein said first dataset includes data derived from an image collected by a first detector of a first region of said substrate [a second die to be inspected (first region) on a wafer is scanned and image data (first data set) is obtained from the first die by detector 24a (first detector) (col. 4, lines 44-55, col. 5, lines 7-21, Fig 1 (item 24a), Fig. 2 (perspective 1, base)];

obtaining a second dataset, wherein said second dataset includes data derived from an image collected by a second detector of at least a portion of said first region of said substrate [two base perspective images of the wafer base area are generated simultaneously by detectors 24a, 24b (col. 4, lines 64-66), a fraction of the base area (at least a portion of said first region) is scanned and image data (second data set) is collected by detector 24b (col. 5, lines 7-21, Fig 1 (item 24b), Fig. 2, (perspective 2, base)] ,

obtaining a third dataset, wherein said third dataset includes data derived from an image collected by said first detector from a second region of said substrate, wherein said second region of said substrate is expected to be substantially identical to said first region [a reference area, which is a first die (second region) neighboring the second die and is identical to the inspected base area (col. 4, lines 44-55) is scanned and image data (third data set) is obtained by detector 24a (first detector) ((col. 4, lines 44-55, col. 5, lines 7-21, Fig 1 (item 24a), Fig. 2 (perspective 1, reference)];

obtaining a fourth dataset, wherein said fourth dataset includes data derived from

an image collected by said second detector of at least a portion of said second region of

said substrate [two reference perspective images of the wafer reference area are

generated simultaneously by detectors 24a, 24b (col. 5, lines 1-3), a fraction of the

reference area (at least a portion of said second region) is scanned and image data

(fourth data set) is collected by detector 24b (col. 5, lines 7-21, Fig 1 (item 24b), Fig. 2,

perspective 2, reference)]; and

processing information derived from said first, second, third and fourth datasets

to determine whether a defect exists in at least one of said first or second regions

[(col.5, lines 32-41, Fig. 2, defect location)].

As to claim 17, Wagner further discloses, wherein said information is processed

by combining a first function representing a comparison of said first and third datasets

with a second function representing a comparison of said second and fourth datasets [a

comparison step is carried out for each perspective (detector) separately (col.7, lines

6165). The base and reference images of each perspective (detector) are compared

separately (col. 8, lines 11-12). A comparison map is created by calculating the absolute

difference of the base and reference area images (col. 8, lines 20-24). The generation

of a separate comparison map (difference image) for each of the two perspectives (first

and second detectors) followed by generating a completed comparison map from the

comparison maps (difference images) of the individual perspectives (detectors) (col. 10,

lines 15-19, col. 8, lines 65-67). As shown by Figs 2 and 8, comparison map 2

(difference image) is created by calculating the absolute difference of the base (first

dataset) and reference (third dataset) area images of perspective 1 (first detector).

Comparison map 1 (difference image) is created by calculating the absolute difference

of the base (second dataset) and reference (fourth dataset) area images of perspective

2 (second detector). A completed comparison map from the comparison maps

(difference images) of the individual perspectives (detectors) is generated by combining

the two perspective comparison maps].

As to claim 18, Wagner further discloses, wherein said comparison is an image

substraction [the comparison is difference image (see claim 17 above), a difference

image is an image substraction].

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 2, 19-20, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wagner et al. (U.S. Patent 5,659,172) as applied to claim 1 above, and further in

view of Maeda et al. (U. S. Patent 6,169,282).

As to claim 2, Wagner further discloses, wherein the step of processing

information comprises:

calculating the difference signal for each pixel with said first detector, calculating

the difference signal for each pixel with said second detector, performing a

mathematical operation on the two difference signals, [a comparison step is carried out

for each perspective (detector) separately (col.7, lines 6165). The base and reference

images of each perspective (detector) are compared separately (col. 8, lines 11-12). A

comparison map is created by calculating the absolute difference of the base and

reference area images (col. 8, lines 20-24). The generation of a separate comparison

map (difference image signal) for each of the two perspectives (first and second

detectors) followed by generating a completed comparison map from the comparison

maps (difference image signals) of the individual perspectives (detectors) (performing a

mathematical operation) (col. 10, lines 15-19, col. 8, lines 60-67). As shown by Figs 2

and 8, comparison map 2 (difference image signal) is created by calculating the

absolute difference of the base and reference area images of perspective 1 (first

detector). Comparison map 1 (difference image signal) is created by calculating the

absolute difference of the base and reference area images of perspective 2 (second

detector). A completed comparison map from the comparison maps (difference image

signals) of the individual perspectives (detectors) is generated by combining

(mathematical operation) the two perspective comparison maps].

Wagner does not disclose, comparing the result of said operation with a

threshold.

Maeda discloses a pattern inspection method and apparatus. An electron beam

scans a sample and electrons generated from the wafer by irradiation of the electron

beam are detected (col. 10, lines 18-22). Image signals detected from a location on a

chip is compared with image signals detected from the same location of adjacent chips

to perform a chip comparison inspection (col. 11, lines 5-18). A subtracted image sub (x, y) is generated (col. 11, lines 55-57). A threshold is used to judge whether a defect exists (col. 13, lines 15-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Maeda's teachings to modify Wagner's method by comparing the resulted subtracted image to a threshold in order to compare images with extremely high precision and comparison inspection can be realized highly sensitively to reduce more effectively false defect detection.

As to claims 19, and 20, Wagner does not disclose, wherein said combination represents a third function including summing said first function squared with said second function squared, and, wherein said combination is compared against a predetermined range of values to determine whether a defect exists.

Maeda discloses a pattern inspection method and apparatus. A substrate having plurality of patterns formed as to be identical is imaged, an image of the first pattern arranged on the substrate is detected, an image of the second pattern formed so as to be identical with the first pattern is detected (col. 3, lines 1-8). Both image of the first pattern and image of the second pattern to be detected are secondary charged particle images (col. 3, lines 25-26). A summing of difference image squared (third function) is obtained (col. 6, line 45) and a threshold (predetermined range of values) is used to judge whether a defect exists (col. 13, lines 9-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Maeda's teachings to modify Wagner's method by summing said first function squared with said second function squared, and, wherein said combination is compared against a predetermined

range of values to determine whether a defect exists in order to compare images with extremely high precision and comparison inspection can be realized highly sensitively to reduce more effectively false defect detection.

As to claim 28, both Wagner (Fig. 1, col. 4, lines 13-24) and Maeda (Fig. 18, col. 3, lines25-26) discloses, wherein at least two portions of said substrate are exposed to said particles, and wherein said detectors are used to detect charged particles emitted from said portions, and wherein data from said detectors is used to determine whether potential defects exist within said portions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samir A. Ahmed whose telephone number is (571) 272-7413. The examiner can normally be reached on Mon-Fri 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (571) 272-7414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
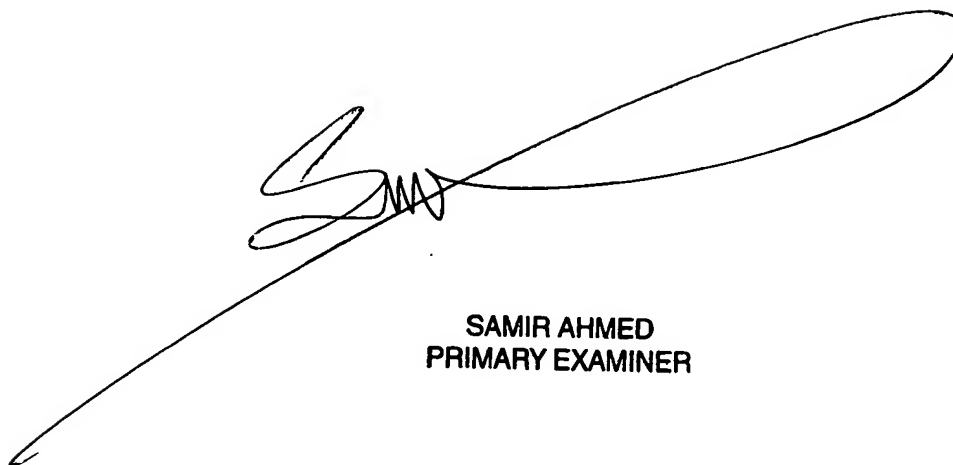
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SAMIR AHMED
PRIMARY EXAMINER